

Appl. No. 10/695,630
Amdt. dated March 15, 2006
Reply to Office action of December 15, 2005

REMARKS

The Examiner is thanked for the thorough examination and search of the subject.

- 5 In regards to the Title, Applicants have amended the Title to "CHIP PACKAGE WITH MULTIPLE CHIPS CONNECTED BY BUMPS" to limit the focus to the claimed invention. Applicants respectfully request that this title be entered by amendment.

- 10 The applicant hereby withdraws a benefit for claiming prior applications. In regards to the related patents and patent applications, Applicant has provided information on related patents and patent applications relevant to the present application.

Withdrawal of the disclosure being objected to is respectfully requested as the related patents and patent applications are updated.

- 15 Withdrawal of the drawings being objected to is respectfully requested as reference number "790" indicates wires in line 5, paragraph [0084].

- Claims 75, 78-83, 86-89, 91-94 and 97-107 are pending; Claims 75, 78-80, 83, 86-88, 91, 94 and 97-101 are currently amended; Claims 102-107 are newly added;
20 Claims 1-74, 76, 77, 84, 85, 90, 95 and 96 are canceled.

Some or all of pending claims are believed to be in condition for Allowance, and that is so requested.

- 25 Response to Claim Rejections under 35 U.S.C. 112

Withdrawal of the claim rejection under 35 U.S.C. 112, second paragraph, is respectfully requested as Claim 94 has been amended.

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Response to Claim Rejections under 35 U.S.C. 102 and 103

Applicants respectfully traverse the rejections for at least the reasons set forth
5 below.

Response to Claims 75 and 78-82

10 As currently amended, independent claim 75 is recited below:

75. A multi-chip structure comprising:

a first chip comprising a pad comprising a copper layer and a nickel layer
over said copper layer;

a second chip; and

15 a tin-containing material connecting said pad to said second chip.

Section I

20 *Reconsideration of Claims 75-79 and 81-82 rejected under 35 U.S.C. 102(e) as
being anticipated by US6,787,442 to Hayashida is requested in accordance with the
following remarks.*

Applicants respectfully assert that the electronic component claimed in claim 75
patentably distinguishes over the citation by Hayashida (US6,787,442).

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Hayashida teaches that a circuitry component comprises a chip 9 and a module
substrate 11 connected by multiple bumps 6. ~ See FIGS. 3 and 6 ~ Applicants
respectfully traverse the Examiner opinions that Hayashida's module substrate 11 can be

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considered as a chip. ~See the third paragraph, page 5, in the latest office action mailed Dec. 15, 2005~ Those skilled in the art should not typically think a module substrate can be deemed as a chip. A chip definitely has one or more P and N regions on a semiconductor substrate, formed for one or more active devices. Those skilled in the art should not typically think a module substrate may have one or more P and N regions on a semiconductor substrate. The structure of a chip is significantly different from that of a module substrate.

Hayashida fails to teach a chip can be mounted to another chip, but teaches a chip can be mounted to a module substrate. The mechanism or consideration of a tin-containing material connecting multiple chips is different from that of a tin-containing material connecting a chip to a module substrate because the structure of a chip is significantly different from that of a module substrate. The Examiner should search for the technology field of "a tin-containing material connecting multiple chips" to build the prima-facie cases, but not search for the technology field of "a tin-containing material connecting a chip to a module substrate" to build the prima-facie cases.

For at least the foregoing reasons, applicants respectfully submit independent claim 75 patently distinguishes over the prior art references, and should be allowed. For at least the same reasons, dependent claims 78-82 patently define over the prior art as well.

Section II

Reconsideration of Claims 75-82 rejected under 35 U.S.C. 102(e) as being anticipated by US2003/0052409 to Matsuo et al is requested in accordance with the following remarks.

Applicants respectfully assert that the electronic component claimed in claim 75 patentably distinguishes over the citation by Matsuo et al (US2003/0052409).

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Matsuo et al teach that a circuitry component comprises two chips 303 and 307 connected to each other. ~ See FIG 12 ~ However, Matsuo et al fail to teach a tin-containing material can be used to connect two chips 303 and 307, as claimed in claim 75.

For at least the foregoing reasons, applicants respectfully submit independent claim 75 patently distinguishes over the prior art references, and should be allowed. For at least the same reasons, dependent claims 78-82 patently define over the prior art as well.

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Section III

Reconsideration of Claims 75-82 rejected under 35 U.S.C. 102(e) as being anticipated by US6,734,556 to Shibata is requested in accordance with the following remarks.

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Applicants respectfully assert that the electronic component claimed in claim 75 patentably distinguishes over the citation by Shibata (US6,734,556).

Shibata teaches that a circuitry component comprises two chips 1 and 2 connected by a tin-containing material 3. ~ See FIGS. 1B and 2A ~ The chip 1 comprises a pad, connected to the tin-containing material 3, constructed from a barrier metal layer 14 and a bump electrode 11, wherein the barrier metal layer 14 consists of a first layer made of Ti or Cr, a second layer made of W, Pt, Ag, Cu, or Ni, and a third layer made of Au, and wherein the bump electrode 11 is made of Au. ~ See FIG 1C; lines 7-17, paragraph [0052] ~ However, Shibata fails to teach the pad may comprise a structure of "a nickel layer over a copper layer", as claimed in claim 75.

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For at least the foregoing reasons, applicants respectfully submit independent claim

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75 patently distinguishes over the prior art references, and should be allowed. For at least the same reasons, dependent claims 78-82 patently define over the prior art as well.

Response to Claims 83, 86-89 and 91-93

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As currently amended, independent claim 83 is recited below:

83. A multi-chip structure, comprising:

a first chip comprising:

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a semiconductor substrate comprising multiple MOS devices,

a metallization structure over said semiconductor substrate,

a passivation layer over said metallization structure, an opening
in said passivation layer exposing a top surface of a first pad of said
metallization structure, and

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a second pad connected to said top surface of said first pad,
wherein said second pad comprising a copper layer and a nickel layer over
said copper layer;

a second chip over said first chip; and

a tin-containing material connecting said second pad to said second chip.

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Section I

*Reconsideration of Claims 83-90 and 92-93 rejected under 35 U.S.C. 102(e) as
being anticipated by US6,787,442 to Hayashida and of claim 91 rejected under 35 U.S.C.*

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*103(a) as being unpatentable over US6,787,442 to Hayashida in view of US6,734,556 to
Shibata is requested in accordance with the following remarks.*

Applicants respectfully assert that the electronic component claimed in claim 83

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patentably distinguishes over the citation by Hayashida (US6,787,442).

Hayashida teaches that a circuitry component comprises a chip 9 and a module substrate 11 connected by multiple bumps 6. ~ See FIGS. 3 and 6 ~ Applicants respectfully traverse the Examiner opinions that Hayashida's module substrate 11 can be considered as a chip. ~See the third paragraph, page 5, in the latest office action mailed Dec. 15, 2005~ Those skilled in the art should not typically think a module substrate can be deemed as a chip. A chip definitely has one or more P and N regions on a semiconductor substrate, formed for one or more active devices. Those skilled in the art should not typically think a module substrate may have one or more P and N regions on a semiconductor substrate. The structure of a chip is significantly different from that of a module substrate.

Hayashida fails to teach a chip can be mounted to another chip, but teaches a chip can be mounted to a module substrate. The mechanism or consideration of a tin-containing material connecting multiple chips is different from that of a tin-containing material connecting a chip to a module substrate because the structure of a chip is significantly different from that of a module substrate. The Examiner should search for the technology field of "a tin-containing material connecting multiple chips" to build the prima-facie cases, but not search for the technology field of "a tin-containing material connecting a chip to a module substrate" to build the prima-facie cases.

For at least the foregoing reasons, applicants respectfully submit independent claim 83 patently distinguishes over the prior art references, and should be allowed. For at least the same reasons, dependent claims 86-89 and 91-93 patently define over the prior art as well.

Section II

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Reconsideration of Claims 83-93 rejected under 35 U.S.C. 102(e) as being anticipated by US2003/0052409 to Matsuo et al is requested in accordance with the following remarks.

5 Applicants respectfully assert that the electronic component claimed in claim 83 patentably distinguishes over the citation by Matsuo et al (US2003/0052409).

Matsuo et al teach that a circuitry component comprises two chips 303 and 307 connected to each other. ~ See FIG. 12 ~ However, Matsuo et al fail to teach a
10 tin-containing material can be used to connect two chips 303 and 307, as claimed in claim 83.

For at least the foregoing reasons, applicants respectfully submit independent claim 83 patentably distinguishes over the prior art references, and should be allowed. For at
15 least the same reasons, dependent claims 86-89 and 91-93 patentably define over the prior art as well.

Response to Claims 94 and 97-101

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As currently amended, independent claim 94 is recited below:

94. A multi-chip structure, comprising:

a first chip comprising:

a semiconductor substrate comprising multiple MOS devices,
25 a metallization structure over said semiconductor substrate,
a passivation layer over said metallization structure, an opening
in said passivation layer exposing a first pad of said metallization
structure,

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- a trace over said passivation layer, and
a second pad connected to said first pad through said trace,
wherein said second pad comprising a copper layer and a nickel layer over
said copper layer;
5 a second chip over said first chip; and
a tin-containing material connecting said second pad to said second chip.
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Section 1

- 10 *Reconsideration of Claims 94-100 rejected under 35 U.S.C. 102(e) as being
anticipated by US6,787,442 to Hayashida and of claim 101 rejected under 35 U.S.C.
103(a) as being unpatentable over US6,787,442 to Hayashida in view of US6,734,556 to
Shibata is requested in accordance with the following remarks.*

- 15 Applicants respectfully assert that the electronic component claimed in claim 94
patentably distinguishes over the citation by Hayashida (US6,787,442).

- Hayashida teaches that a circuitry component comprises a chip 9 and a module
substrate 11 connected by multiple bumps 6. ~ See FIGS. 3 and 6 ~ Applicants
20 respectfully traverse the Examiner opinions that Hayashida's module substrate 11 can be
considered as a chip. ~See the third paragraph, page 5, in the latest office action mailed
Dec. 15, 2005~ Those skilled in the art should not typically think a module substrate
can be deemed as a chip. A chip definitely has one or more P and N regions on a
semiconductor substrate, formed for one or more active devices. Those skilled in the art
25 should not typically think a module substrate may have one or more P and N regions on a
semiconductor substrate. The structure of a chip is significantly different from that of a
module substrate.

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Hayashida fails to teach a chip can be mounted to another chip, but teaches a chip can be mounted to a module substrate. The mechanism or consideration of a tin-containing material connecting multiple chips is different from that of a tin-containing material connecting a chip to a module substrate because the structure of a chip is significantly different from that of a module substrate. The Examiner should search for the technology field of "a tin-containing material connecting multiple chips" to build the prima-facie cases, but not search for the technology field of "a tin-containing material connecting a chip to a module substrate" to build the prima-facie cases.

For at least the foregoing reasons, applicants respectfully submit independent claim 94 patently distinguishes over the prior art references, and should be allowed. For at least the same reasons, dependent claims 97-101 patently define over the prior art as well.

Section II

Reconsideration of Claims 94-101 rejected under 35 U.S.C. 102(e) as being anticipated by US2003/0052409 to Matsuo et al is requested in accordance with the following remarks.

Applicants respectfully assert that the electronic component claimed in claim 94 patentably distinguishes over the citation by Matsuo et al (US2003/0052409).

Matsuo et al teach that a circuitry component comprises two chips 303 and 307 connected to each other. ~ See FIG 12 ~ However, Matsuo et al fail to teach a tin-containing material can be used to connect two chips 303 and 307, as claimed in claim 94.

For at least the foregoing reasons, applicants respectfully submit independent claim 94 patently distinguishes over the prior art references, and should be allowed. For at

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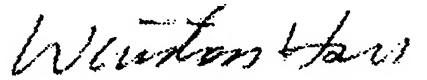
least the same reasons, dependent claims 97-101 patently define over the prior art as well.

CONCLUSION

- 5 For at least the foregoing reasons, it is believed that the pending claims 75, 78-83, 86-89, 91-94 and 97-107 are in proper condition for allowance.

Sincerely yours,

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